RIVERSIDE ENERGY RESOURCE CENTER
SMALL POWER PLANT EXEMPTION
RESPONSE TO CEC DATA REQUESTS
04-SPPE-01

Technical Area: Water and Soil Resources

BACKGROUND

Much of the project site vicinity was historically used to produce agricultural crops. The native soil materials have been removed from the Project site. The current site surface consists primarily of a thin layer of fill material. Quartz diorite bedrock outcrops along with loose boulders occupy approximately 10 percent of the site surface. The fill material consists primarily of silty sands that are light brown, dry and loose. Fill material is typically 1.5 feet thick. Below the fill material is slightly to moderately weathered quartz diorite bedrock.

Data Request 48: When was the most recent use of the site for agricultural purposes? What was the crop?

Response: Personal communication with Ernie Meloy, a long-standing employee with the Riverside Regional Water Quality Treatment Plant helped clarify the plant site's past use. According to Ernie, the plant site proper was not used for agricultural production. An agricultural day labor camp occupied the site from the Mid 1940's and was likely active into the early 1960's.

Data Request 49: What is the permeability of the project site and retention/infiltration basin area?

Response: Based on the geotechnical investigation by LOR Geotechnical Group, Inc. (2004) the surface, clear water absorption rates for the site were found to be on the order of 0.34 to 1.9 minutes per inch. This results in an absorption rate of 20 gallons per square foot per day. This incorporates a factor of safety of at least 5.0.

BACKGROUND

The RERC project proposes to discharge storm water to an on-site storm water retention/infiltration basin. The water discharged to this pond will percolate through to the ground water beneath the site. No storm water will be directed to a ZLD system.

Data Request 50: What is the depth to ground water?

Response: Based on the geotechnical investigation by LOR Geotechnical Group, Inc. (2004), perched groundwater was encountered within 15 of 22 borings advanced across the site at depths ranging from 11 to 26 feet beneath the existing ground surface. The City of Riverside, Public Utilities, Water Department that would supply water to the site indicated they have no wells in the area of the site. They referred our questions on groundwater to Western Municipal Water District, (WMWD). They indicated there are no wells in the area of the site as there is no true groundwater table at the site due to the shallow bedrock. Groundwater would be encountered as infilling of cracks and fissures.

Data Request 51: Is construction dewatering anticipated? If so, how will the testing for contaminates and discharge be handled?

Response: Construction de-watering is not anticipated for this project as we do not expect excavations to extend down to 11 feet.

Data Request 52: What is the estimated annual volume of potable and recycled water needed for the project?

Response: Potable Water: Intermittent uses for potable water will be for toilets and sinks. With the small number of people expected to be operating and maintaining the site (approximately 5), this requirement will be very small, on the order of 12,000 gal/year. Other uses of potable water will be for eyewash stations and fire water, both of which should normally be zero flow.

Recycled Water: Approximately 32,000,000 gallons per year if both CTG's each run 1330 hrs/yr.

Data Request 53: What is the volume of the retention/infiltration basin and how was adequate sizing determined? Please show calculations and discuss assumptions.

Response: The retention/infiltration basin was sized to contain the difference in runoff volume from the site between pre and post development conditions for a 50-year, one-hour storm event. The approximate size of the retention/infiltration basin is estimated to be 10,000 cubic feet. The calculations are attached.

Data Request 54: How often is the storm water expected to exceed the capacity of the retention basin?

Response: The frequency with which the volume of the retention/infiltration basin would be exceeded depends upon the recurrence interval and the duration of the storm event. As stated above, the basin volume is based on the difference in on-site runoff for pre and post-development for a 50-year one-hour storm event. The corresponding inches of rainfall for such a storm is 1.11 inches of rain in one hour.

Historical rainfall data does not provide hourly rainfall. However, data indicates that there are only five months out of the year, November through March, when the total rainfall for the entire month has ever exceeded one inch. This data suggests that the capacity of the basin being exceeded would be a very rare occurrence. In the event of the 50-year one-hour storm the basin would contain the volume generated onsite, but the flow coming from offsite would exceed the capacity of the retention basin and surface flow to the catch basin located on the WWTP property.

Data Request 55: What is the estimated volume of water that will be percolated by the retention/infiltration basin?

Response: The retention/infiltration basin is intended to infiltrate the volume of water that has been retained up to the maximum capacity of the basin (10,000 cubic feet). The approximate area of the bottom of the basin available for infiltration is estimated to be 1000 square feet. The geotechnical engineer has determined an infiltration rate for the native soils of 2.67 cubic feet per day per square foot. Therefore, if the basin were full, the contents would infiltrate in approximately 82 hours.

Data Request 56: Please provide a description of the measures being taken to ensure that contaminated water is not discharged to the retention basin during operation of the power plant. This description should include any mechanical devices such as oil/water separators or filters and any detention and monitoring of the water prior to release to the storm water retention basin.

Response: Several measures are being taken to prevent contamination of the water deposited into the storm water retention/infiltration basin. Areas in the plant that are likely to contain chemicals or oil will be contained.

The chemical feed equipment for the cooling tower will have a concrete containment area with no drain outlet. This containment area will only contain a low point sump to assist in manual pump out operations in the event of rain water or a chemical leak. The liquid in the containment will be tested to determine whether or not it contains chemicals. If it does, it will be collected and properly disposed of.

The generator step-up transformers and the auxiliary transformers will contain oil and therefore a concrete containment will be supplied to contain any oil leaks. The transformer oil containments will have a low point sump with drain lines leading to the plant waste water system. The drain lines will have normally closed, locked, manual isolation valves to contain the oil in the event of a spill/leak. If a spill/leak occurs, manual pumpout and clean up will be required. The liquid in the containment will be tested to determine whether or not it contains oil. If it does, it will be collected and properly disposed of. If it is water, the manual valve will be opened and the water will drain to the plant wastewater system.

The combustion turbine lube oil equipment and the gas compressors will utilize concrete containments to contain oil leaks. The containments will have low point sumps with drain lines leading to the plant waste water system. The drain lines will have normally closed, locked, manual isolation valves to contain the oil in the event of a spill/leak. If a spill/leak occurs, manual pumpout and clean up will be required. The liquid in the containment will be tested to determine whether or not it contains oil. If it does, it will be collected and properly disposed of. If it is water, the manual valve will be opened and the water will drain to the plant wastewater system.

The liquid resulting from a combustion turbine water wash and from the fuel gas scrubbers and filters will be drained to storage tanks. The liquid will then be manually pumped out of the tanks and properly disposed of.

The aqueous ammonia unloading area, the ammonia pumps, the ammonia tank, and the ammonia evaporation skid will all be provided with concrete containments to prevent ammonia from entering the retention/infiltration basin. The containments will not have a drain outlet. This containment area will only contain a low point sump to assist in manual pump out operations in the event of rain water or an ammonia leak. The liquid in the containment will be tested to determine whether or not it contains ammonia. If it does, it will be collected and properly disposed of. In addition, there will be ammonia vapor detectors and liquid detectors to detect any spills/leaks of ammonia.

Equipment drains that may contain oil (such as chiller package, combustion turbine package, air compressor package, etc.) will be routed to the plant wastewater system.

Drains that may contain oil that are routed to the plant waste water system will pass through an oil water separator. The oil water separator will be a single wall vessel installed in a concrete vault. Clean water from the separator will be pumped to the waste water treatment plant.

Data Request 57: Please provide a description of the ZLD system.

Response: We will be utilizing a ZLD system for this project. We are in the process of evaluating the various ZLD vendors prior to making a selection. We are limiting our options only to those systems which do NOT contribute to air emissions (such as those that use gas fired equipment).

RIVERSIDE ENERGY RESOURCE CENTER
DRAINAGE CALCULATIONS

STORM WATER DISCHARGE CALCULATIONS:

The peak discharge rate is calculated using the Rational Method. The Rational Method formula is defined by the following equation.

$$Q = (C)\ (I)\ (A)$$

Where C is the runoff coefficient based on soil type, soil moisture content, cover type, impervious surfaces, surface water retention and prior rainfall. A is the drainage area in acres, and I is the rainfall intensity in inches per hour. The following values for C and corresponding areas are used in this report.

Pavement areas	C = 0.85 (Area = 4.5 acres)
Graveled areas	C = 0.30 (Area = 7.7 acres)
Landscaped areas	C = 0.25 (Area = 3.9 acres)

The weighted value of C is calculated as follows:

$$\begin{array}{l} 0.85(4.5) = 3.825 \\ 0.30(7.7) = 2.31 \\ 0.25(\underline{3.9}) = \underline{0.975} \\ \quad\;\; 16.1 \quad\;\; 7.11 \end{array}$$

$$C = 7.11/16.1 = 0.44$$

From Table 2 in the SWPPP, the value of I for a 50 year storm, one hour duration is 1.11 in/hr. The corresponding flow is:

$$Q = 0.44(1.11)(16.1) = 7.9 \text{ cfs}$$

STORM WATER RETENTION VAULT SIZING CALCULATIONS:

For sizing of the retention basin, we consider the difference in volume between the pre-development and post-development conditions for a 50-year storm of one hour duration. The same values of C used above, are used for the post development calculations resulting in a weighted C value of 0.44. For the pre-development calculations a C value for existing conditions utilized is 0.30. From Table 2, we have the value of 1.1 inch of rain in one hour for a 50-year storm.

Pre-Development Volume

V = (1.11 in/hr)(1 ft/12 in)(43,560 sf/ac)(16.1 ac)(0.3) = 19,462 cubic feet

Post-Development Volume

V = (1.11 in/hr)(1 ft/12 in)(43560 sf/ac)(16.1 ac)(0.44) = 28,544 cubic feet

The volume required for the retention basin then is 28,544 – 19,462 = 9082 cubic feet.